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Taxonomic Review of the Korean Xanthorhoini (Geometridae: Lepidoptera)

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Abstract The tribe Xanthorhoini of Larentiinae in Korea is reviewed. Eighteen species of eight genera, *Scotopteryx* Hübner, *Costaconvexa* Agenjo, *Catarhoe* Herbulot, *Orthonama* Aubert, *Xanthorhoe* Hübner, *Euphyia* Hübner, *Epirrhoe* Hübner, and *Glaucorhoe* Herbulot, are recognized. Four new taxonomic changes are suggested: *Scotopteryx golovushkini* Kostjuk **syn. nov.** and *S. kuznecovi* Herbulot **syn. nov.** of *S. acutangulata* Inoue; *Microcalcarifera* Inoue **syn. nov.** of *Catarhoe* Herbulot; and one new combination, *Catarhoe obscura* (Butler) **comb. nov.** A key to genera, diagnosis of each species, distribution map and illustrations of adults including male and female genitalia are provided.

Key words Taxonomy, Larentiinae, Korea

INTRODUCTION

The tribe Xanthorhoini, a tribe of the Larentiinae, is a group of small to middle geometrid moths comprising more than 13 genera which occur all over the world (Viidalepp, 1996). The monophyly of the tribe is not clearly defined, resulting in the ambiguity of the tribe boundary. However several previous studies using adults and immatures in Europe (Pierce, 1914; Patocka, 1995) and North America (Forbes, 1948; McGuffin, 1958) indicated that this group is more or less a natural taxon. Holloway (1997), in his comprehensive study on the Borneon moths, defined the tribe based on two characters, a large pair of coremata just distal to the 8th segment in the male abdomen, and the presence of calcar of the male genitalia.

The primary aim of the present study is to review genera and species of the Xanthorhoini in Korea. Up to now, few taxonomic studies have been made on the members of the Korean Xanthorhoini (e.g., Choi and Shin, 1997; Beljaev and Oh, 2001). In this study I follow Viidalepp's (1996) concept of the tribe (cf. Ferguson, 1983).

MATERIALS AND METHODS

Eighteen species, comprising eight genera, were examined in this study: *Scotopteryx* Hübner, *Costaconvexa* Agenjo, *Catarhoe* Herbulot, *Orthonama* Aubert, *Xanthorhoe* Hübner, *Euphyia* Hübner, *Epirrhoe* Hübner, and *Glaucorhoe* Herbulot. Most species were examined externally and were dissected for genitalia examination. For males, the vesica of the aedeagus was also everted, following the general procedure of Bolte (1990). Nomenclature for the adult morphology and genitalia follows Scoble (1992).

In this study, the material examined was obtained from the following institutions and collec-

tions: Finnish Museum of Natural History, Helsinki, Finland (FMNH); Kangwon National University, Chuncheon, Korea (KNU); Kyung Hee University, Seoul, Korea (KHU); Forest Museum, The National Arboretum, Pocheon, Korea (NAK); private collection of Mr. Kim, Sung-Soo, Seoul, Korea (KSS); Mokpo National University, Muan, Korea (MNU); National Science Museum, Tokyo, Japan (NSMT); The Natural History Museum, London, England (NHM); National Institute of Agricultural Science and Technology, Suwon, Korea (NIAST); Naturhistoriska Riksmuseet, Stockholm, Sweden (RM); and Zoologische Staatssammlung, München, Germany (ZSM).

Abbreviations for the provinces in Korea are as follows. GW, Gangwon-do; GG, Gyunggi-do; CB, Chungchungbuk-do; CN, Chungchungnam-do; JB, Jeollabuk-do; JN, Jeollanam-do; GB, Gyungsangbuk-do; GN, Gyungsangnam-do; and JJ, Jeju-do.

RESULTS AND DISCUSSION

Key to genera of the Xanthorhoini in Korea

1. Central fascia of forewing with multiple waving lines ..... *Glaucorhoe*
   Central fascia of forewing with a distinct band 2
2. Central fascia of forewing slanted inward 3
   Central fascia of forewing transverse and medially or costally projected 4
3. Male antenna bipectinate; postmedial line of both fore and hindwings undulating ..... *Orthonama*
   Male antenna filiform; postmedial line of both wings straight ..... *Costaconvexa*
4. Male antennae bipectinate 5
   Male antennae filiform 6
5. Central fascia of forewing without medial projection ..... *Scotopteryx*
   Central fascia of forewing with medially or costally projected ..... *Xanthorhoe*
6. Abdomen distinct with double black dots on each dorsal segment ..... *Epirrhoe*
   Abdomen without double black dots 7
7. Antemedial line of forewing distinct with blackish, straight slender band; costal part of postmedial line strongly slanted outward ..... *Catarhoe*
   Antemedial line of forewing indistinct, dentate; costal part of postmedial line straight ..... *Euphyia*

Scotopteryx Hübner

Scotopteryx Hübner 1825, Verz. bekannter Schmett.: 338.

Type species: *Geometra coarctaria* [Denis and Schiffermüller, 1775] by monotypy. Type locality (TL): [Austria] Vienna district.

Scotopteryx acutangulata (Inoue) 깊은산물결자나방

(Figs. 1, 17, 31, 45, 65)

Ortholitha acutangulata Inoue, 1941, Mushi, 14: 23. TL: Mozan, North Korea, Paratype 1 ♂ without abdomen in NHM.

Petrophora acutangulata: Shin, 1983, Illustrated Flora and Fauna of Korea, 27: 1002.

Scotopteryx golovushkini Kostjuk, 1991, Vestn. zool., 4: 27. TL: Dahurian steppes, lake Barun-lorei W. shore, Russia. Holotype ♂ in Kiev National Taras Shevchenko University, Ukraine. syn. nov.

Scotopteryx kuznecovi Herbulot, 1996, Bull. Soc. ent. Mulhouse, 1996: 24. TL: Vladivostok, dist. 20, Nachodka, Russia. Holotype ♂ in ZSM. syn. nov.

Diagnosis. Both species, *Scotopteryx acutangulata* and *S. chenopodiata*, are identified by

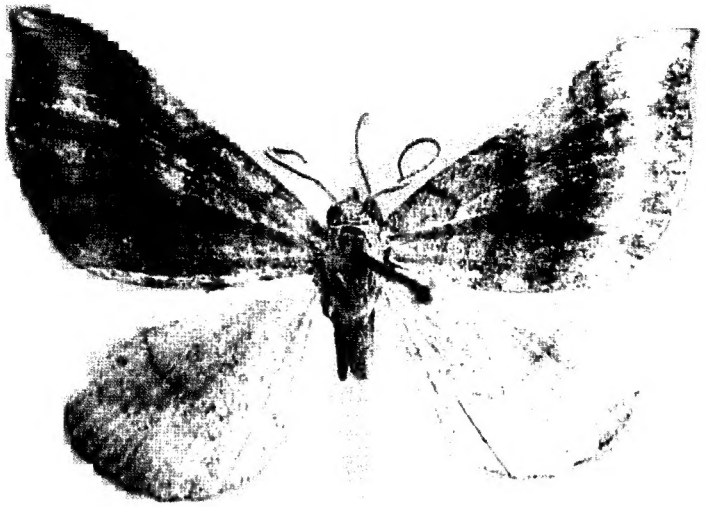


Fig. 1. An adult of *Scotopteryx acutangulata* Inoue (a paratype preserved in NHM).

the bipectinate male antennae and the greyish wings with dark reddish central fascia of the forewing. *Scotopteryx acutangulata* differs from *S. chenopodiata* in the shape of male genitalia: the long uncus, the long and sclerotized costa, the short harpe and the absence of cornutus in the vesica. In the female genitalia *S. acutangulata* can be separated from *S. chenopodiata* by the long length of the anterior apophyses and pyriform corpus bursae with partial sclerotization.

Material examined. 1 ♂, paratype, Mozan, North Korea, 20 VIII 1939, Coll. T. Hirao, in NHM (Holotype and genitalia preparation were destroyed during World War II, H. Inoue, pers. comm.).

Remarks. Shin (1996) listed two species of *Scotopteryx* in Korea: *S. chenopodiata* (Linnaeus) and *S. acutangulata*. The distributions of these two species are partly overlapped in East Asia: *S. chenopodiata chenopodiata* occurs in northern Europe, Turkey, and central Asia; and *S. chenopodiata sibirica* (Bang-Haas) and *S. acutangulata* in the eastern Palaearctic region from southern Siberia, Mongolia and Transbaikalia to the Russian Far East (Viidalepp, 1996). Although morphological differences including genitalia are present between *S. chenopodiata sibirica* and *S. acutangulata*, the scarcity of *S. chenopodiata sibirica* in the Russian Far East has led to ambiguous distribution boundary. Nevertheless the occurrence of *S. chenopodiata sibirica* in Korea is ambiguous since no specimen has been collected.

The description and genitalic figures of *S. acutangulata* (Inoue, 1941) confirm that *S. golovushkini* and *S. kuznecovi* are junior synonyms of *S. acutangulata*. Scoble (1999) noted that the holotype of *S. acutangulata* is in the collection of Kyushu University, Japan. However, the holotype is absent and was probably destroyed during World War II (H. Shima, pers. comm.).

Distribution. Korea, Russia, Mongolia.

Costaconvexa Agenjo

Costaconvexa Agenjo, 1949, Graellsia, 7: 105.

Type species: *Phalaena polygrammata* Borkhausen, 1794, Naturg. eur. Schmett., 5: 560, by original desig-

nation. TL: Europe.

Costaconvexa caespitaria (Christoph) 가는줄물결자나방

(Figs. 4, 18, 32, 46, 65)

Cidaria caespitaria Christoph, 1881, Bull. Soc. imp. Nat. Moscou, 55(3): 112. TL: Amur, Russia.
Costaconvexa caespitaria: Kim, Nam & Kim, 1986, Journ. Nat. Acad. Sci. Rept. Korea, Natural Sci. series, 25: 66.

Diagnosis. This species (wingspan 23–24 mm) can be identified by the whitish ground color of wings with thick dark brownish central fascia of forewing and multiple, slanted, sinuous lines of hindwing. The male genitalia can be distinguished by the following characters: long, hooked uncus with compressed tip; and costally largely expanded valva with a sharply projected sacculus. The female genitalia can be distinguished by the long and medially bent ductus bursae and ovate corpus bursae without a signum.

Material examined. [GG] Suwon, 1 ♂, 12 IV1976 (KT Park); 1 ♀, 14 VI 1974 (NIAST)

Remarks. Scoble (1999) listed three species of *Costaconvexa*: *C. polygrammata* (Borkhausen), *C. centrostrigata* (Wollaston), and *C. caespitaria*. The monophyly of the genus is not defined yet. However, two species, *C. centrostrigata* and *C. caespitaria*, showed unique characters in the uncus, valva and vesica of the male genitalia and in the ductus and corpus bursae of the female genitalia. Prout (1914) noted that *C. polygrammata* has two broods. Similarly *C. caespitaria* was collected in two times, April and June, in Korea.

Distribution. Korea, Japan, Russian Far East.

Orthonama Hübner

Orthonama Hübner, 1825, Verz. bekannter Schmett.: 331.
Type species: *Phalaena vittata* Borkhausen, 1794, Naturg. eur. Schmett., 5: 63. TL: Europe: forest near Darmstadt, by subsequent designation by Warren, 1895, Novit. zool., 2: 116.

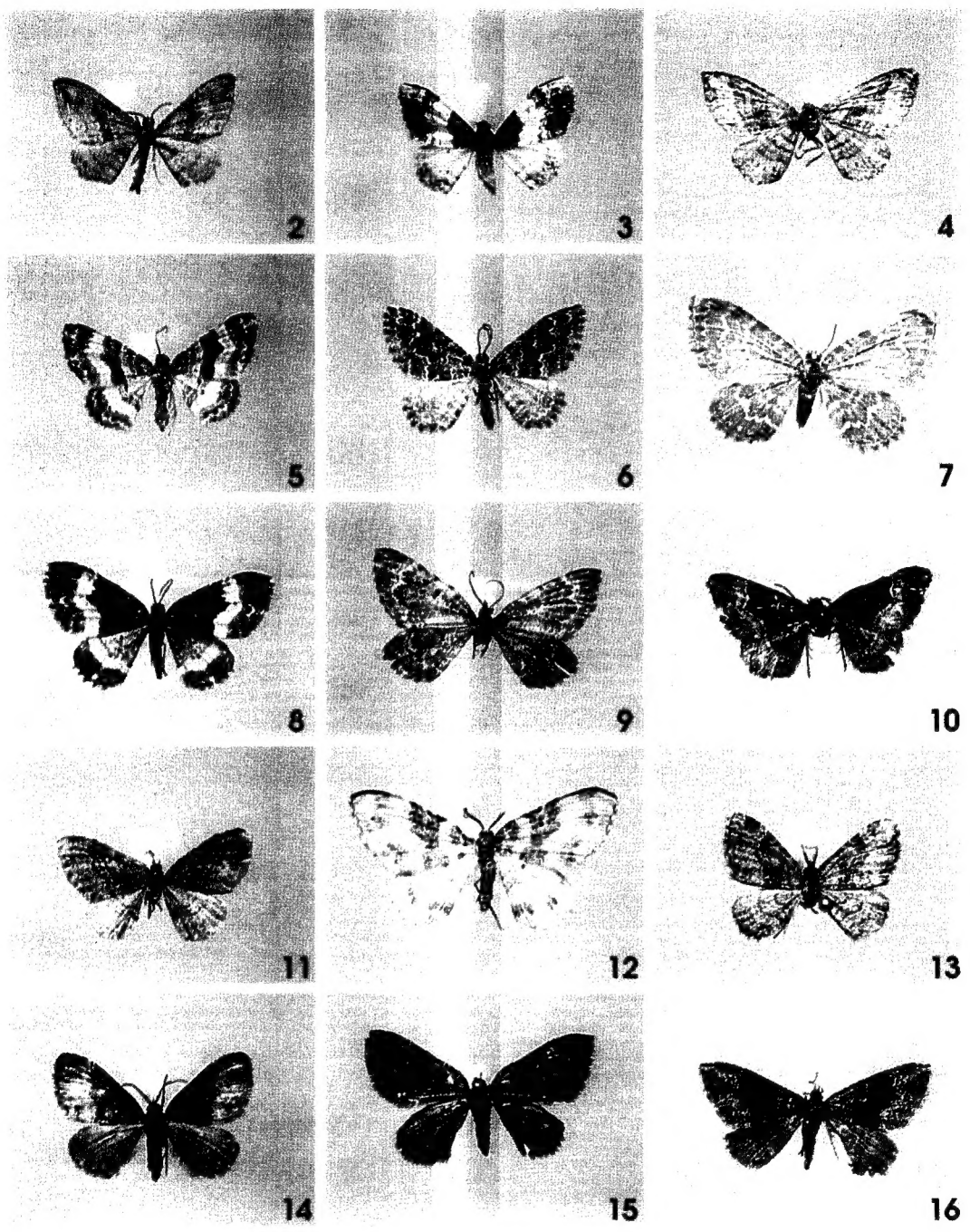
Orthonama obstipata (Fabricius) 갈색각시물결자나방

(Figs. 2, 19, 33, 47, 65)

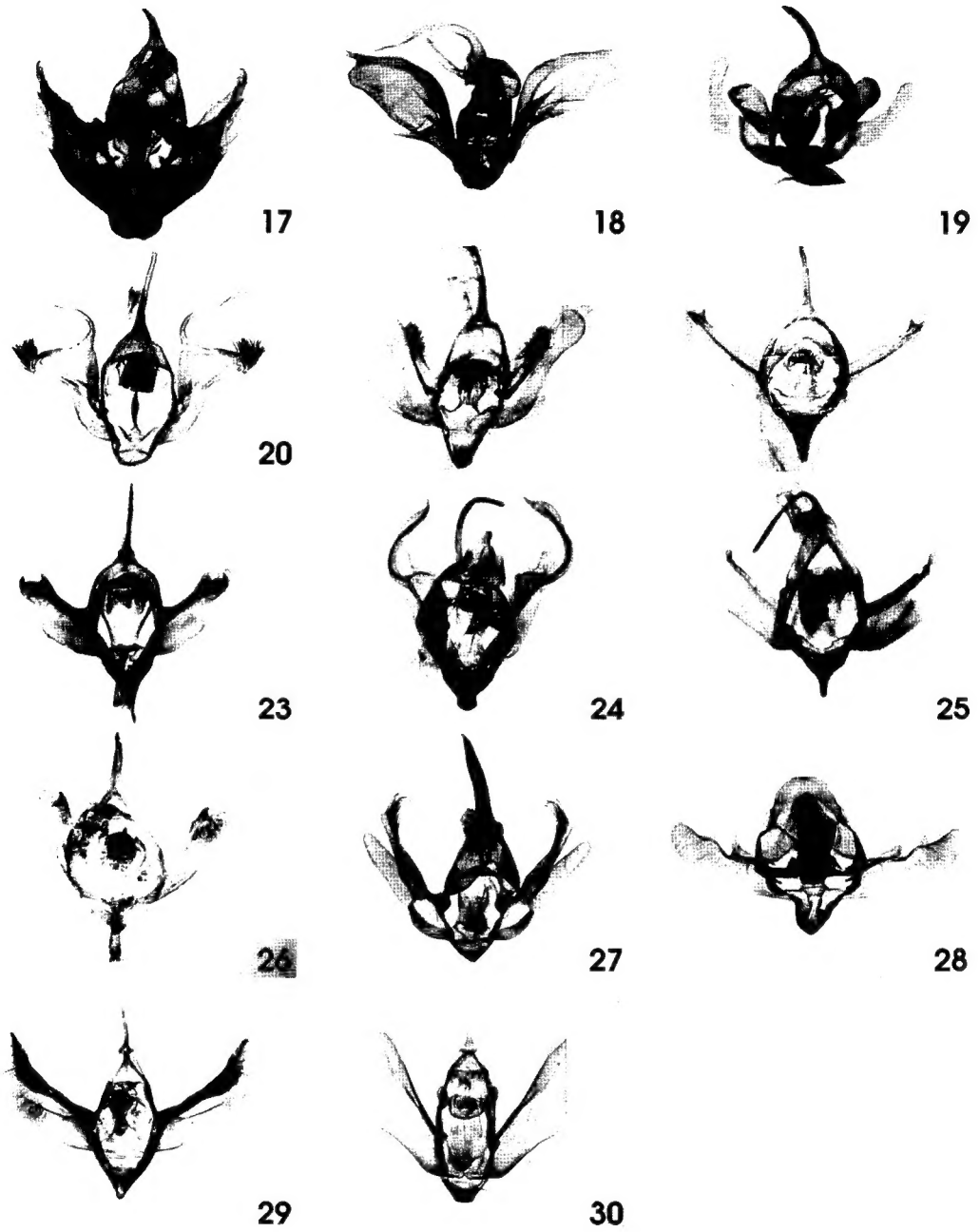
Phalaena obstipata Fabricius, 1794, Ent. Syst., 3(2): 199. TL: Barbaria, North Africa.
Geometra fluviata Hübner, 1799, Samml. Eur. Schmett. 5 Geometrae (2): pl. 54, figs. 280, 281. TL: Europe.
Cidaria fluviata Hübner: Leech, 1897, Ann. Mag. nat. Hist., (6) 19: 651.
Nycterosea obstipata: Pak, 1969, Report Biological Circle, Dong Myung Girls' High School: 45.
Orthonama obstipata: Shin, 1983, Illustrated Flora and Fauna of Korea, 27: 197.

Diagnosis. This species (wingspan 16–20 mm) is variable in wing ground color from whitish to dark reddish. Adults can be identified by the thin dark brown central fascia with multiple sinuous transverse lines on fore and hindwings. This species is similar to *Costaconvexa caespitaria* in the shape of central fascia of forewing, but can be easily distinguished by the thin band width and smaller size. Bipectinate antennae of male is also a good diagnostic character from *C. caespitaria*. The male genitalia can be identified by the bifurcated valva, the upper costal arm with semi-circularly arranged spines at the distal end and the lower rod-shaped sacculus arm. The female genitalia can be identified by the semi-rounded lamella antevaginalis and the medially tapered ductus bursae.

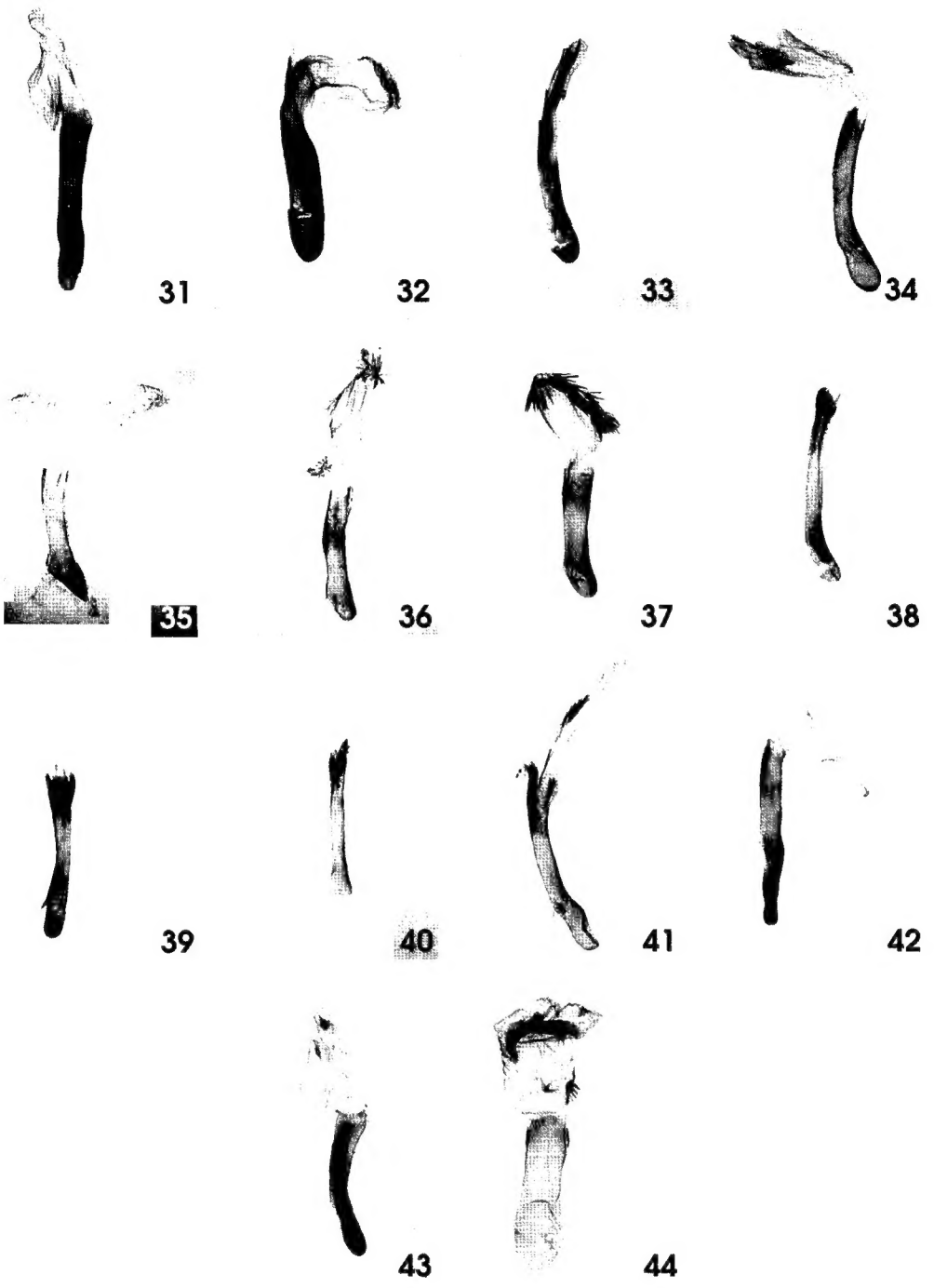
Material examined. [GW] Mt. Seolak, 1 ♂, 1 VII 1973 (KT Park); Mt. Chiak, 1 ♂, 30 V 1974 (KR Choi); Seomyon, Yangyang, 1 ♂, 30 VI 1988 (KT Park) (NIAST) [GG] Suwon, 1 ♂, 2 X 1965 (Han); 1 ♂, 17 VI 1982 (CH Ryu); 1 ♂, 24 VII 1982 (DJ Im); 1 ♂, 15 VIII 1982 (CH Ryu); 1 ♀, 5 VI 1976 (KT Park); 1 ♂, 14 VII 1982 (CH Ryu); 1 ♂, Seodundong, 18 VI 1974 (YI Lee); 1 ♂, 26 VIII 1974 (KT Park); 1 ♂, 14 VII 1975 (KT Park); Ansong, 1 ♀, 23



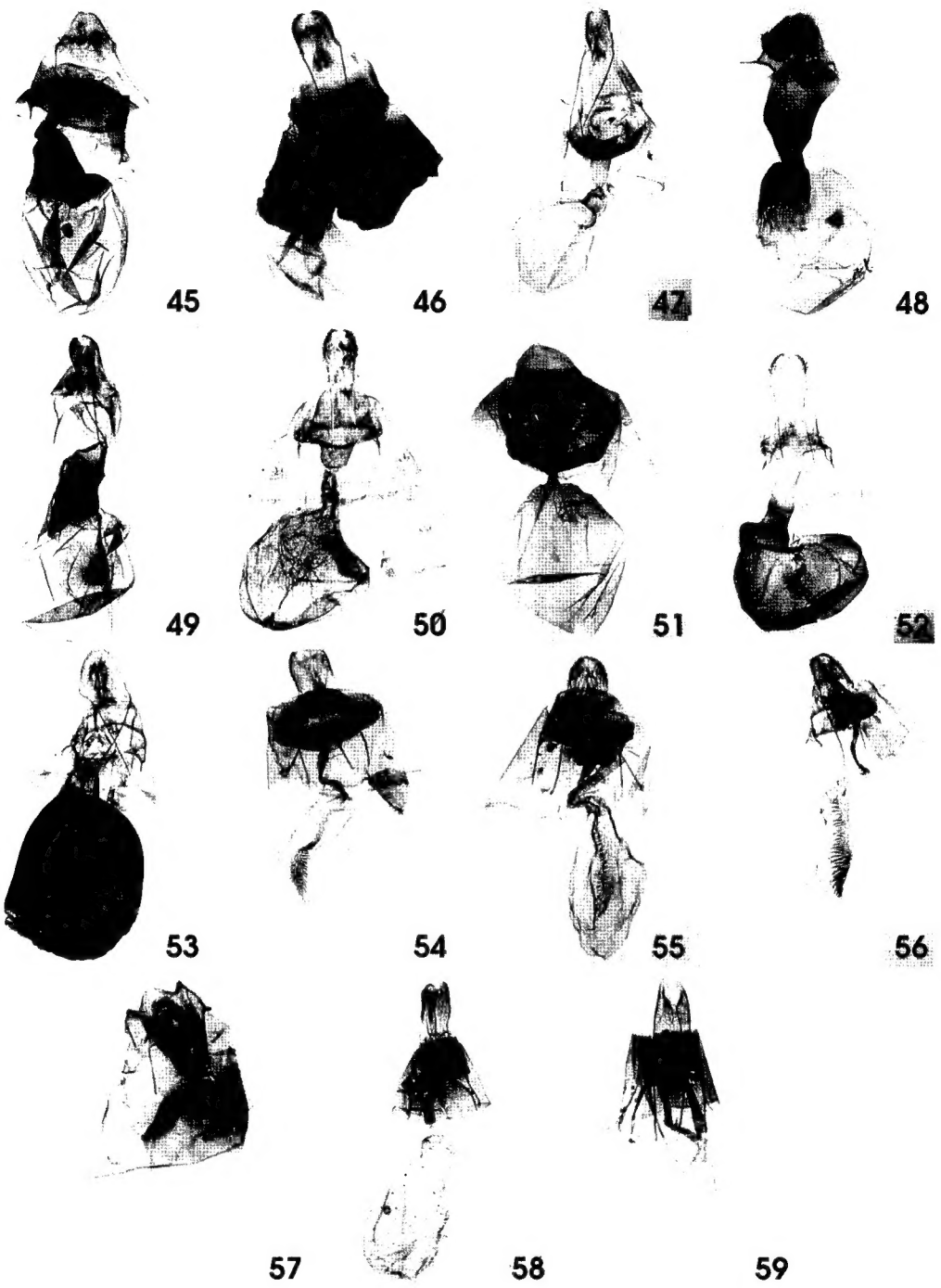
Figs. 2–16. Adults. 2. *Orthonama obstipata*; 3. *Catarhoe yokohamae*; 4. *Costaconvexa caespitaria*; 5. *Epirrhoe supergressa*; 6. *Juxtephria consentaria*; 7. *Glaucorhoe unduliferaria*; 8. *Euphyia cineraria*; 9. *E. discomelaina*; 10. *Xanthorhoe biriviata*; 11. *X. designata*; 12. *X. abraxina*; 13. *X. hortensiaria*; 14. *X. muscicapata*; 15. *X. quadrifasiata*; 16. *X. saturata*.



Figs. 17–30. Male genital capsule. 17. *Scotopteryx acutangulata*; 18. *Costaconvexa caespitaria*; 19. *Orthonama obstipata*; 20. *Xanthorhoe abraxina*; 21. *X. quadrifasiata*; 22. *X. saturata*; 23. *X. designata*; 24. *X. hortensiaria*; 25. *X. biriviata*; 26. *X. muscicapata*; 27. *Glaucorhoe unduliferaria*; 28. *Euphyia cineraria*; 29. *Catarhoe yokohamae*; 30. *C. obscura*.



Figs. 31–44. Aedeagus with the everted vesica. 31. *Scotopteryx acutangulata*; 32. *Costaconvexa caespitaria*; 33. *Orthonama obstipata*; 34. *Xanthorhoe abraxina*; 35. *X. quadrifasiata*; 36. *X. saturata*; 37. *X. designata*; 38. *X. hortensiaria*; 39. *X. biriviata*; 40. *X. muscicapata*; 41. *Glaucorhoe unduliferaria*; 42. *Euphyia cineraria*; 43. *Catarhoe yokohamae*; 44. *C. obscura.*



Figs. 45–59. Female genitalia. 45. *Scotopteryx acutangulata*; 46. *Costaconvexa caespitaria*; 47. *Orthonama obstipata*; 48. *Catarhoe yokohamae*; 49. *Catarhoe obscura*; 50. *Xanthorhoe quadrifasiata*; 51. *X. abraxina*; 52. *X. saturata*; 53. *X. designata*; 54. *X. hortensiaria*; 55. *X. biriviata*; 56. *X. muscicapata*; 57. *Glaucorhoe unduliferaria*; 58. *Euphyia cineraria*; 59. *E. discomelaina*.

VII 1990 (S.B. Ahn); Gwangneung, 1♀, 10 VII 1982 (C.H. Ryu); Mt. Suri, 1♀, 23 V 1981 (KT Park); 1♂, 14 VII 1989 (WS Cho) (NIAST) [Seoul] Jam Sil, 1♂, 27 VI 1973 (YI Lee) (NIAST) [GN] Milyang, 1♂, 21V 1973 (HK Kim); 1♂, 21 IV1973 (HK Kim); 1♂, 5 VI 1973 (HK Kim); 1♀, 7 VI 1973 (HK Kim) (NIAST) [JB] Namwon, 1♂, 28 IX 1989 (NIAST) [JN] Is. Soheuksan, 1♀, 24 VI 1974 (KY Choi); Mt. Yogi, 1♀, 3 IX 1992 (SB Ahn) (NIAST); Mt. Duryun, 1♂, 11 VI 2001 (SW Choi); Chungkye, Muan, 1♂, 22 V 2001 (MNU) [JJ] Seogwipo, 1♂, 6 VII 1976 (HS Kim) (NIAST).

Remarks. This species is known to be a pest species of various agricultural plants such as apple, strawberry, cabbage, plum, green onion, and Chinese bellflower. This species is also found in *Quercus* (Oh *et al*., 2001). The monophyly of the genus has not been defined yet.

Distribution. Korea, Japan, China, Central Asia, southern Europe, Russia.

Catarhoe Herbulot

Catarhoe Herbulot, 1951, Revue fr. Lepidopt., 13: 25.

Type species: *Cidaria basochesiata* Duponchel, 1830, in Godart & Duponchel, Hist. nat. Lepid. Papillons Fr., 8(1): 558, pl. 210. TL: [France] Hyeres district, by original designation.

= *Microcalcarifera* Inoue, 1982, Moths of Japan, 1: 475. syn. nov.

Catarhoe yokohamae (Butler) 점여섯물결자나방

(Figs. 3, 29, 43, 48, 69)

Melanthia yokohamae Butler, 1881, Trans. ent. Soc. Lond., 1881: 422. TL: Yokohama, Japan.

Cidaria yokohamae: Leech, 1897, Ann. Mag. nat. Hist., (6) 19: 643.

Euphia yokohamae colorata Bryk, 1949, Ark. Zool., 41 A(1): 176. Holotype, ♂, Mt. Myohang [Myokosan], North Korea 1935, 28 VII 1936 Sten Bergmann in RM [examined].

Diagnosis. This species (wingspan 20–22 mm) is similar to *Mesolueca albicillata* (Linnaeus) in the whitish wing ground color and basal and termen of forewing, but can be identified by the smaller wingspan and whitish apex of fore and hindwings. The male genitalia can be identified by the small, tongue-shaped calcar and the costa with dentate distal tip. The female genitalia can be identified by the broad ostium bursae, sclerotized ductus bursae and ovate corpus bursae with round patch of signa.

Additional Material examined. 1♂, Mt. Myohang [Myokosan] 1935, 28 VII 1936, Sten Bergmann labelled in red "Paratypus" (RM); [Japan] Nagano, 1♀, 21 VII 1959 (T Ebato) (NSMT).

Remarks. Surprisingly the male and female genitalia of *Catarhoe yokohamae* are nearly identical with *Catarhoe cuculata* (Hufnagel). Prout (1914) stated that these two species are closely related, but he didn't examined the genitalia of both species. Since Prout, the genitalic comparison between two species hasn't been attempted. Despite of the identity in the genitalia, the taxonomic decision is not easy due to the differences of wing pattern elements: costal part of postmedial line is less blackish and strongly slanted and termen of forewing is tinged with black. Considering the wide distribution of *Catarhoe cuculata*, from Europe to Russian Far East (Viidalepp, 1996), *C. yokohamae* might be one of the subspecies of *C. cuculata*.

Host plant. In Germany, *C. cuculata* feeds on *Galium* spp. (Rubiaceae) (Bartsch *et al*., 2001).

Distribution. Korea, Japan, China, Russian Far East.

Catarhoe obscura (Butler) comb. nov. 쌍무늬물결자나방

(Figs. 30, 44, 49, 69)

Cidaria obscura Butler, 1878, Ann. Mag. nat. Hist., (5)1: 450. TL: Yokohama, Japan.

Cidaria (*Coenotephria*) *obscura*: Prout, 1914, in Seitz, Macrolep. World, 4: 252.
Coenotephria obscura: Easki *et al.*, 1957, Icon. Hetero. Jap. Color. Natur., 1: 205.
Microcalcarifera obscura: Inoue, 1982, Moths of Japan, 1: 475.

Diagnosis. This species (wingspan 24-28 mm) is externally similar to *Catarhoe yokohamae* in the wing pattern element of forewing - the straight blackish antemedial line and the costally slanted postemedial line - and the male genitalia - slender uncus, process of costa of valva, tongue-shaped calcar with long hairs and short digitate anellus lobe - but can be distinguished by the blackish wing ground color and the distal part of costa of male genitalia. The female genitalia can be identified by the bowl-shaped ostium bursae, broad and sclerotized ductus bursae and pear-shaped corpus bursae with a protuberant membranous process.

Material examined. [JN] Is. Jin (Chelma Mt.), 2 ♂, 19 VI 1990 (JS Ju); 1 ♂, Mokpo National Univ., Muan, 3 VII 2002 (SW Choi) (MNU) [JAPAN] Takao-San, Tokyo, 1 ♂, 1 ♀, 16 VII 1949, 30 VII 1949 (H Inoue) (NSMT).

Remarks. Inoue (1982) erected the genus, *Microcalcarifera*, based on the type species *Cidaria obscura* (Butler). For the designation of the genus, he described the following diagnostic characters: short labial palpi and 3rd segment slightly projected above frons; simple antennae with very short hairs on the male antennae; double areole, R_1 separated from the upper part of areole, R_{2-4} connate, R_5 projected from the distad of areole; cross vein of hindwing smoothly curved; large coremata on male's seventh abdominal segment; and small calcar in the male genitalia. However, morphological comparison between *Catarhoe basochesiata* and *Cidaria obscura* suggests that these two species can be grouped into the same taxon, based on the identical wing venation, the blackish or dark brownish slender antemedial line and costally thick blackish postmedial line of forewing and the tongue-shaped calcar with long hairs and dentate process on the costa of male genitalia.

Distribution. Korea, Japan, W. China.

Xanthorhoe Hübner

Xanthorhoe Hübner, 1825, Verz. bekannter Schmett.: 327.
Type species: *Geometra montanata* [Denis and Schiffermüller, 1775], Ankündung syst. Werkes Schmett. Wienergegend: 113. TL: [Austria] Vienna district, by subsequent designation by Warren, 1893, Proc. zool. Soc. Lond., 1893: 376.
= *Ochyria* Hübner, 1825, Verz. bekannter Schmett.: 334.
Type species: *Phalaena quadrifasiata* Clerck, 1759, Icon. Insect. rariorum, 1: pl. 6, fig. 4, by subsequent designation by Hulst, 1896, Trans. Am. ent. Soc., 23: 292. TL: [Europe].

Xanthorhoe fluctuata (Linnaeus) 검정무늬산물결자나방

(Fig. 67)

Phalaena fluctuata Linnaeus, 1758, Syst. Nat. (Ed. 10) 1: 527. TL: Sweden.
Dysstroma fluctuata: Bryk, 1949, Ark. Zool., 41 A(1): 181.
Xanthorhoe fluctuata: Shin, 1983, Illustrated Flora and Fauna of Korea, 27: 997.
Xanthorhoe fluctuata malleola Inoue, 1955, Tinea, 2: 77; Beljaev & Oh, 2001, Ins. Koreana, 18: 76.

Diagnosis. This species, whitish wings with blackish fascia, is externally similar to *X. abraxina*, but differs in the broken central fascia and the costally marked termen of forewing. The male genitalia can be identified by the long and bifurcated tip of costa and short sacculus, being a half of costa in length.

Material examined. [North Korea] Juul (Shoutsu), 1 ♀, 25 VIII 1935 Sten Bergman leg., Genital preparation no. RM 9725 in RM.

Remarks. Beljaev and Oh (2001) noted that the Korean specimens differed from the northern European ones in the small size and darker coloration of wings and in the male and female genitalia. They considered that Korean population is closer to Japanese subspecies, *X. fluctuata malleola*.

Host plant. Bartsch *et al.* (2001) reported that *X. fluctuata* feeds on *Lobularia maritima* and *Alliaria petiolata* (Cruciferae) in Germany.

Distribution. Korea, Japan, Europe, Turkey, Russia, Central Asia.

Xanthorhoe abraxina (Butler) 노랑다리물결자나방

(Figs. 12, 20, 34, 51, 68)

Melanippe abraxina Butler, 1879, Ann. Mag. Nat. Hist., (5) 4: 443 TL: Yokohama, Japan.
Cidaria pudicata Christoph, 1881, Bull. Soc. imp. Nat. Moscou, 55(3): 105. TL: Chingan; Vladivostok, Russia.
Larentia abraxina: Herz, 1905, Ezhog. zool. Muz., 9: 344.
Cidaria abraxina: Seok, 1938, Bull. Teachers' Soc. Nat. Hist. Keijo, 1: 34.
Xanthorhoe abraxina: Jun & Shin, 1980, Theses Coll., Kyung Hee Univ., 10: 431.

Diagnosis. This species (wingspan 32–36 mm) is one of mimic species of *Abraxas* (Ennominae, Geometridae). Adults have whitish wings with blackish central fascia and termen, and parallel black dots on each segment of abdomen. The male genitalia can be identified by the two massive spinular spines on juxta and bifurcated costal arms, the upper arm is slender and the lower arm triangular with long spines at the distal end. The female genitalia can be identified by the semi-round, ditch-shaped lamella antevaginalis.

Material examined. [GW] Mt. Seolak, 1 ♂, 1 ♀, 13 VII 1983; Mt. Gwangduk, 1 ♂, 1 ♀, 26 VI 1990; Mt. Taeback, 2 ♂, 8 ♀, 23–26 VI 1976 (KHU) [GB] Mt. Soback, 1 ♂, 6 VI 1986 (KHU) [JB] Guchondong, Muju, 2 ♂, 1 ♀, 26 VI 1976 (KHU).

Distribution. Korea, Japan, China, Russian Far East.

Xanthorhoe quadrifasiata (Clerck) 네줄물결자나방

(Figs. 15, 21, 35, 50, 67)

Phalaena quadrifasiata Clerck, 1759, Icon. Insect. rariorum, 1: pl. 6, fig. 4. TL: Sweden.
Scotosia ignobilis Butler, 1881, Trans. ent. Soc. Lond., 1881 (3): 423. TL: Yokohama, Japan.
Ochyria quadrifasiata ignobilis: Viidalepp, 1977, Ent. Obozr., 56: 568.
Xanthorhoe quadrifasiata: Kim & Shin, 1996, J. Lep. Soc. Korea, 9: 17.

Diagnosis. This species (wingspan 28 mm) can be identified by the dark brownish wings with blackish slanted central fascia. The male genitalia can be identified by the simple valva with a patch of spines on the middle part of costa and the large, inverse triangular vesica with spinular cornuti. The female genitalia can be identified by the sclerotized ostium bursae, tapering ductus bursae and ovate corpus bursae with rounded patch of signa.

Material examined. [GW] Mt. Seolak, 1 ♀, 11 VI 1983 (SS Kim leg.) (KSS).

Remarks. Both male and female genitalia of nominal subspecies and *ignobilis* of *X. quadrifasiata* are indistinguishable.

Maruta (1929) reported that *Xanthorhoe conspectaria* (Mann, 1859) occurs in the northern part of Korea, Kyungsung. However, this species is flying on Sicily and Madeira and can be confused with *X. quadrifasiata* in the wings (Prout, 1914). Concluded from the distribution and similar appearances between *X. quadrifasiata* and *X. conspectaria*, the record of *X. conspectaria* in Korea might be resulted from misidentification of the former species.

Distribution. Korea, Japan, China, Europe, Mongolia, Russia.

Xanthorhoe saturata (Guenée) 물결자나방

(Figs. 16, 22, 36, 52, 67)

Larentia saturata Guenée, 1858, in Boisduval & Guenée, Hist. nat. Insectes (Spec. gén. Lépid.) 10: 269. TL: Pondichéry, India.

Xanthorhoe saturata: Yoon *et al.*, 1982, Sci & Technol. Korea Univ., 23: 22.

Diagnosis. This species (wingspan 20–24 mm) can be identified by the brownish wings with dark brownish thick central fascia where the postmedial line is undulating. The male genitalia can be identified by the tapering valva with two processes on the costa and two patches of spinular cornuti on the tubular diverticula. The female genitalia can be identified by the simple sterigma and straight and even width of ductus bursae.

Material examined. [GW] Mt. Gwangduk, 1♀, 29 VII 1990 (S.W. Choi) (KHU) [Seoul] Hongneung, 1♂, 25 XI 1998 (NAK) [JB] Gucheondong, Muju, 1♀, 27 VII 1976 (YH Shin) (KHU) [JN] Mt. Jiri, 2♀, 14–17 VII 1976 (YY Ha); Is. Heuksan, 1♀, 12 IX 1975 (NIAST); Mt. Duryun, Haenam, 1♀, 31 V 2002 (TH Hyun) (MNU); Mt. Weolchul, 1♂, 27 VII 1988 (HC Kim) (KHU).

Distribution. Korea, Japan, China, India.

Xanthorhoe designata (Hufnagel) 홍줄애물결자나방

(Figs. 11, 23, 37, 53, 68)

Phalaena designata Hufnagel, 1767, Berlin Mag., 4(6): 612. TL: Berlin region, Germany.

Cidaria (*Ochyria*) *rectantemediana* Wehrli, 1927, in Bang-Haas, Horae macrolepidopt. Reg. palaearct., 1: 94, pl. 11, fig. 21. TL: Ussuri, Sutschansk, Russia.

Xanthorhoe designata: Shin, 1987, Theses Coll., Kyung Hee Univ., 16: 391.

Diagnosis. This species (wingspan 21 mm) can be identified by the greyish ground color with orange central fascia, where the ante and postmedial lines are blackish and postmedial line is costally dentate. The male genitalia can be identified by the slender sclerotized costa and a small harpe of the valva and large sac-like vesica with spinular cornuti. The female genitalia can be identified by the large ovate corpus bursae with partially strongly sclerotized.

Material examined. [GW] Mt. Seolak, 1♀, 10 VIII 1981 (SG Lee) (NIAST).

Host plant. Bartsch *et al.* (2001) noted that *X. designata* feeds on *Sinapsis arvensis*, *Raphanus raphanistrum*, and *Alliaria petiolata* (Cruciferae) in Germany.

Distribution. Korea, Japan, Europe, Russia, Central Asia.

Xanthorhoe hortensiaria (Graeser) 두줄물결자나방

(Figs. 13, 24, 38, 54, 68)

Cidaria hortensiaria Graeser, 1890, Berl. ent. Z., 33(2): 251. TL: Amurlands, Vladivostok, Russia.

Xanthorhoe hortensiaria: Shin, 1981, J. Res. Insti. Sci. & Technol., Kyung Hee Univ., 7: 25.

Diagnosis. This species (wingspan 19–22 mm) can be identified by greyish wings with dark reddish central fascia where the postmedial line is smooth without undulating. The male genitalia can be identified by the long, hooked uncus, the triangular plate projected from the posterior of tegumen and long, hooked sacculus with sharply pointed tip. The female genitalia can be identified by the band-shaped lamella antevaginalis, narrow ductus bursae and large sac-shaped corpus bursae with band-shaped patch of signa.

Material examined. [GG] Pyongtaek, 1♂, 4 VI 1974 (KT Park); Suwon, 1♂, 22 VIII 1974 (KT Park), 1♂, 2 VIII 1974 (KT Park), 1♂, 2 V 1922 (H Okamoto), 2♂, 22 VI 1965, 1♂, 11 IV 1969 (DS Lee), 1♂, 30 VI 1983 (SB Ahn), 1♂, 15 IX 1965 (SC Han); Sungnam, 1♀, 19 V 1987 (WS Cho) Mt. Yogi, 1♂, 2 VII 1974 (KT Park) (NIAST) [GW] Mt. Taebaek, 3♂,

21-23 V 1987 (KHU) [JN] Mt. Mudeung, 1♀, 13 VI 2002 (SW Choi) (MNU).

Remarks. Females show broader band width of central fascia than males in the material examined in the present study.

Distribution. Korea, Japan, China, Russian Far East.

Xanthorhoe biriviata (Borkhausen) 흰줄물결자나방

(Figs. 10, 25, 39, 55, 68)

Phalaena Geometra biriviata Borkhausen, 1794, Natur. eur. Schmett., 5: 384. TL: Europe.
Cidaria angularia Leech, 1897, Ann. Mag. nat. Hist., (6) 19: 652. TL: Oiwake, Japan.
Xanthorhoe biriviata: Shin, 1984, Theses Coll., Kyung Hee Univ., 13: 123.
Xanthorhoe biriviata angularia: Shin, Jeong & Kim, 1990, Theses Coll., Kyung Hee Univ., 19: 275.

Diagnosis. This species (wingspan 20-24 mm) can be identified by the brownish wings with blackish central fascia and dark brown termen of both wings. The male genitalia can be identified by the thick tubular calcar, simple valva with a small, distal process on the costa, and distal processes of the aedeagus with narrow vesica where cornutus is missing. The female genitalia of *X. biriviata* are similar to those of *X. muscicapata* but can be identified by the large, plate-like lamella postvaginalis and antevaginalis.

Material examined. [GW] Chunsong, 1♂, 16-17 VIII 1991 (SH Lee); 1♀, Hongcheon, 5 VIII 1989 (KJ Hong) (NIAST); Mt. Taebaek, 1♂, 21 V 1987 (KHU) [GG] Gwangneung, 1♀, 3 VIII 2000 (BK Byun) (NAK).

Host plant. Larvae feed on *Impatiens* (Balsaminaceae) in Japan (Sato and Nakajima, 1987).

Distribution. Korea, Japan, Russia, Europe, Central Asia.

Xanthorhoe muscicapata (Christoph) 가흰물결자나방

(Figs. 14, 26, 40, 56, 67)

Cidaria muscicapata Christoph, 1881, Bull. Soc. imp. Nat. Moscou, 55 (3): 102. TL: Waldschluchten, Raddefka, Russia.
Loxofidonia muscicapata originalis Bryk, 1949, Ark. Zool., 41A (1): 173. TL: Juul, [Shoutsu], North Korea.
Xanthorhoe muscicapata: Pak, 1969, Report Biological Circle, Dong Myung Girls' High School: 45.

Diagnosis. This species (wingspan 18-20 mm) can be distinguished by the dark blackish basal and central fascia of forewing. Male antennae pectinations are partial, long at the proximal and medial parts and absent at the distal part. The male genitalia can be identified by the juxta with lined processes and simple valva with a spine at the distal tip of costa. The female genitalia can be identified by the striated lamella postvaginalis and narrow ductus bursae and linearly arranged large spinular signa of corpus bursae.

Material examined. [GG] Gwangneung, 3♂, 13 VIII 1994 (BK Byun) (KNU) Yangpyeong, Mt. Yumeongsan, 4♂, 1♀, 30 VII 1990 (SH Oh); Mt. Suri, 1♀, 23 V 1981 (YY Ha), 1♀, 2 VIII 1986 (WS Cho), 1♀, 14-15 VII 1989 (SB Ahn); Suwon, 1♀, 21 IX 1982 (CH Ryu); Mt. Taewha, Kwangju, 1♂, 2 IX 1998 (DP Lyu) (NIAST); Mt. Hwaak, 1♂, 26 IV 1989 (KHU) [GW] Hongchon, 1♂, 27 VI 1989 (KS Lee); Chuncheon, 1♀, 25 VII 1991 (SB Ahn) (NIAST), 1♀, 22 V 1985, 1♂, 15 V 1985 (KT Park); Hwengsung-Dam, 1♂, 1♀, 22 VIII 1994 (BK Byun); Chuncheon-Dam, Chuncheon, 4♂, 1♀, 27 VII 1995 (HK Lee & MS Go); Seomyon, Yangyang, 1♂, 1♀, 15 V 1987 (KT Park); Dunnae, 1♀, 7 VII 1990 (SH Oh); Weonchang-gogae 1♂, 6 IX 1990 (BK Byun & SW Cho) (KNU) [JB] Muju, 1♀, 12 VIII 1975 (KT Park) (NIAST) [JN] Jangsung, Baekyangsa, 2♂, 28 VII 1993 (SB Ahn); Mt. Jiri, 1♂, 14 VII 1976 (YY Ha); Mt. Mudeong, Kwangju, 1♂, 29 VI 1990 (SH Oh) (NIAST) [GN] Mt. Keum, Namhae, 1♂, 24 VII 1985 (KT Park) (NIAST) [N. Korea] Juul, 2♂, 22-23 VII

1935, *Xanthorhoe muscicapata originalis* Bryk paratypes (RM).

Remarks. Prout (1914) placed this species in *Asaphodes* Meyrick, because this species shows an undivided areole of forewing. However, the shape of male genital capsule including the presence of calcar indicates that this species is closely related to *Xanthorhoe*.

Distribution. Korea, Japan, China, Russian Far East.

Xanthorhoe stupida (Alphéraky) 지옥물결자나방

Cidaria quadrifasciaria stupida Alphéraky, 1897, in Romanoff, Mém. Lépid., 9: 73. TL: Tchidja; Myn-dyn-cha [China].

Cidaria ferrugata stupida: Prout, 1914, in Seitz, Macrolep. World, 4: 227.

Cidaria (*Xanthorhoe*) *stupida aridela* Prout, 1937, in Seitz, Macrolep. World, 4 (Suppl.): 127, pl. 12c. TL: Ussuri, Chabarovsk, Russia.

Xanthorhoe stupida Alphéraky: Sterneck, 1931, Dt. ent. Z., Iris, 45: 83.

Remarks. Sterneck (1931) first recorded the species based one male from Seoul. After Sterneck, no further record is added in Korea (Shin, 1996). Prout (1938) diagnosed the species as follows: it is externally similar to *X. ferrugata* (Linnaeus), but is distinguished by lacking of the angular prominence of costa of valva. He also suspected that the Korean specimen belongs to a subspecies, *aridela*, which is characterized by smaller size and paler wings and occurs in Russian Far East. In the present study, I can't examine this species due to the absence of material.

Distribution. Korea (?), China, Russian Far East.

Glaucorhoe Herbulot

Glaucorhoe Herbulot, 1951, Revue fr. Lepidopt., 13: 26.

Type species: *Cabera unduliferaria* Motschulsky by monotypy. TL: Japan.

Glaucorhoe unduliferaria (Motschulsky) 흰물결자나방

(Figs. 7, 27, 41, 57, 65)

Cabera unduliferaria Motschulsky, 1861, Études ent., 9:36. TL: Japan.

Emmelesia albostrigaria Bremer, 1864, Mem. Acad. Sci. St. Petersb., (7) 8 (1): 85. TL: East Siberia, Bureja Mts; lower Ussuri, Kengka Sea, Russia.

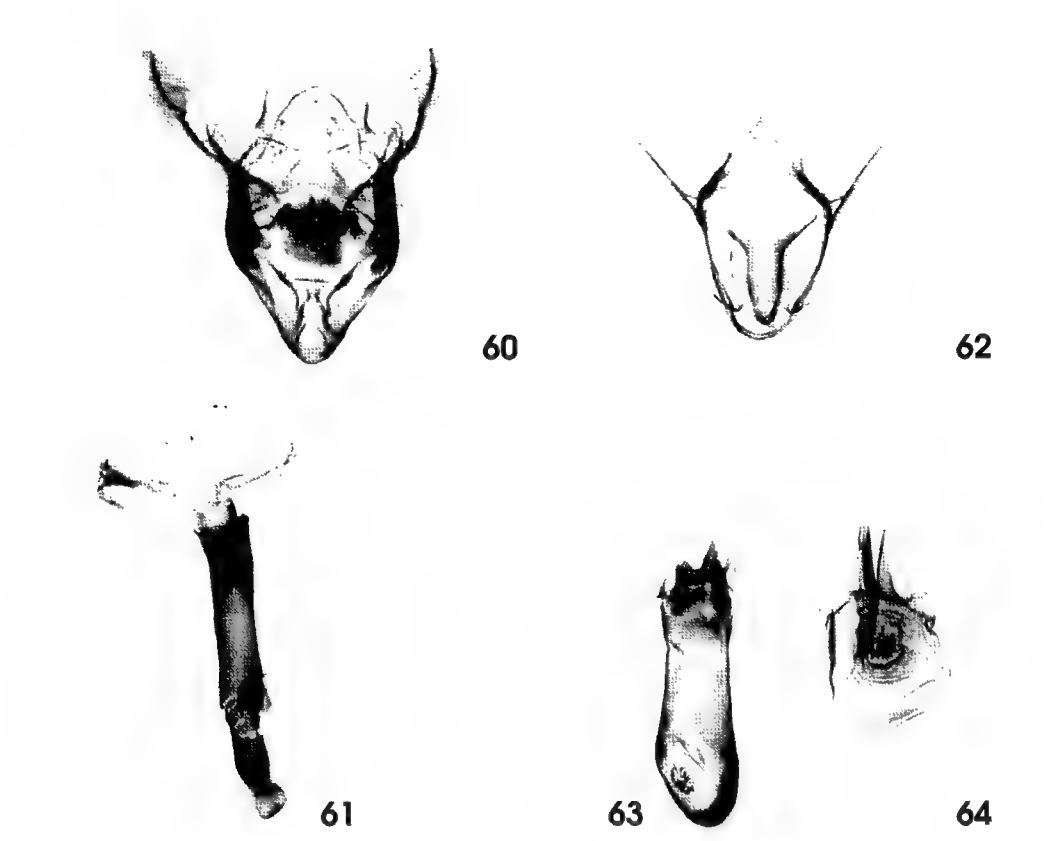
Glaucorhoe unduliferaria albostrigaria: Jun & Shin, 1980, Theses Coll., Kyung Hee Univ., 10: 430.

Xanthorhoe undulifereaia albostrigaria: Shin & Han, 1981, Rept. KACN, 20: 141.

Diagnosis. This species (wingspan 28–32 mm) is externally identified by the greyish wings with multiple whitish sinuous lines of both fore and hindwings. The male genitalia can be distinguished by the long, tapering and strongly sclerotized uncus, the spinular juxta, the massive spines on the costa of valva, and the tubular vesica with a patch of spinular cornuti. The female genitalia can be distinguished by the long, door-shaped lamella postvaginalis, medially bent ductus bursae and the gourd-shaped corpus bursae without signum.

Material examined. [GW] Mt. Yaksu, Hongcheon, 1 ♂, 1 ♀, 9 VIII 1989 (KT Park); Mt. Gyebang, 1 ♂, 2 VIII 1989 (KT Park); Mt. Daeam, 1 ♂, 27 VII 1988 (KT Park) (NIAST); Mt. Gwangduk, 3 ♂, 29 VII 1990; Mt. Taebaek, 3 ♂, 1 ♀, 24 VII 1987; Mt. Kyebang, 1 ♂, 21 VII 1981 (KHU); Mt. Seolak, Inje, 2 ♂, 12 VIII 2001 (SW Choi & TH Hyun) (MNU); [GG] Mt. Hwaak, 1 ♂, 5 VIII 1989 (KHU) [GB] Mt. Sobaek, 1 ♂, 6 VIII 1986 (KHU) [JB] Gucheon-dong, Muju, 1 ♂, 26 VI 1976 (KHU) [N. Korea] Juul, 2 ♂ (RM).

Distribution. Korea, Japan, China, Russian Far East.



Figs. 60–64. Male and female genitalia of *Euphyia* and *Epirrhoe* (redrawn from Choi and Shin, 1997) 60 & 62. Male genital capsule: 60. *Euphyia unangulata*; 62. *Epirrhoe supergressa*. 61 & 63. Aedeagus: 61. *Euphyia unangulata*; 63. *Epirrhoe supergressa*. 64 Female genitalia of *Epirrhoe supergressa*.

Euphyia Hübner

Euphyia Hübner, 1825, Verz. bekannter Schmett.: 326.

Type species: *Geometra picata* Hübner, 1813, Samml. eur. Schmett., 5: pl. 84, fig. 435, by subsequent designation by Hulst, 1896, Trans. Am. ent. Soc., 23:283. TL: [Europe].

Euphyia unangulata (Haworth) 두점끝흰물결자나방

(Figs. 60, 61)

Phalaena unangulata Haworth, 1809, Lepid. Br., (2): 332. TL: U. K.

Euphyia unangulata gekatsungensis Bryk, 1949, Ark. Zool., 41A (1): 175. TL: Hagalgu [Gekatsungu], North Korea.

Euphyia unangulata: Choi & Shin, 1997, Korean J. Entomol., 27: 172.

Diagnosis. This species (wingspan 22–25 mm) is externally similar to *E. cineraria*, but can be identified by the less darkish band between basal and central fascia and the shape of ante and postmedial lines of forewing. The male genitalia of both species, *E. cineraria* and *E. unangulata*, are similar: the large and spatulate uncus, the projected saccus, the scobinate juxta and the simple valva. However, *E. unangulata* can be distinguished by the shape of

ventral part of valva, being the less projected.

Remarks. See Choi and Shin (1997) for more detailed description.

Distribution. Korea, China, Russia, Europe.

Euphyia cineraria (Butler) 가운데흰물결자나방

(Figs. 8, 28, 42, 58, 69)

Cidaria cineraria Butler, 1878, Ann. Mag. nat. Hist., (5)1: 451. TL: Hakodate, Japan.
Euphyia luctuosaria sinuataria Bryk, 1949, Ark. Zool., 41A (1): 174. TL: Juul [Shoutsu], North Korea.
Euphyia cineraria: Pak, 1969, Report Biological Circle, Dong Myung Girls' High School: 43.

Diagnosis. This species (wingspan 28–30 mm) can be identified by blackish basal and central fascia and whitish band between central fascia and termen of forewing. The male genitalia can be separated from *E. unangulata* by the rounded uncus and the basal projection of ventral part of valva. The female genitalia can be identified by the tapering ductus bursae and large corpus bursae with a stellate signum.

Material examined. [GG] Gwangneung, 1 ♂, 1 ♀, 17 VI 1994 (BK Byun & HP Jeong) (KNU) Gwangneung, 1 ♂, 13 VIII 1994 (BK Byun); Mt. Chungkye, 1 ♀, 13 VIII 1976 (JC Paik), 2 ♂, 20 VIII 1976 (HJ Cho); Is. Daebu, 1 ♂, 4 VI 1990 (SH Oh); Mt. Taehwa, Kwangju, 1 ♂, 30 IV 1994 (MJ Ha) (NIAST); Mt. Jugeum, 1 ♀, 29 IV 1993; Mt. Myongji, 2 ♀ ♀, 8 VIII 1989; Mt. Chonma, 1 ♂, 30 IV 1991 (KHU) [GW] Mt. Odae, 1 ♂, 26 VI 1989 (KT Park); Mt. Jeombong, 1 ♀, 10 VIII 1992 (BK Byun & HP Jeong); Hongcheon, 1 ♂, 20 V 1989 (DK Choi); Mt. Samag, 1 ♀, 22 V 1990 (KT Park) (KNU); Gojindong, 4 ♂, 1 ♀, 16 V 1994 (BK Byun & HP Jeong); Chuncheon Dam, 2 ♂, 13 VIII 1994 (BK Byun), 27 VII 1995 (HK Lee & HS Go), 1 ♂, 27 VII 1995 (HK Lee & MS Go); Pyongchang, 1 ♂, 3 VI 1993 (JY Choi) (NIAST); Mt. Taebaek, 2 ♂, 3 ♀, 25 VI 1987, 1 ♂, 1 ♀, 22 V 1987, 1 ♂, 26 VI 1987, 1 ♂, 1 ♀, 23 VII 1987; Mt. Hwaak, 1 ♂, 5 VIII 1989; Mt. Paekduk, 1 ♂, 6 VIII 1981; Mt. Kwangduk, 2 ♂, 26 VI 1990; Hyangnobong, 1 ♂, 13 VI 1992; Mt. Seolak, 1 ♀, 14 VII 1983; Konbongsa, 2 ♂, 22 V 1992 (KHU) [GB] Mt. Sobaek, 1 ♂, 1 ♀, 7 VI 1986; Mt. Bohyun, 1 ♂, 27 VI 1991 (KHU) [JJ] Sungpangak, 1 ♂, 2 VIII 1984 (KS Lee) (NIAST), 1 ♂, 11 VIII 1974 (YH Shin) (KHU); Mt. Halla, 1 ♂, 24 VI 1968 (SM Lee) (KNU).

Distribution. Korea, Japan, China, Russian Far East.

Euphyia discomelaina (Wehrli) 넉점갈색물결자나방

(Figs. 9, 59, 69)

Cidaria (*Euphyia*) *discomelaina* Wehrli, 1931, Mitt. dt. ent. Ges., 2(7): 108. TL: Beijing [Peking], Sumpanting, China.
Euphyia discomelaina: Beljaev & Oh, 2001, Ins. Koreana, 18: 74.

Diagnosis. The species (wingspan 30 mm) can be identified by the greyish wings with undulating transverse lines of both wings with a large discoidal dot on each wing. The female genitalia can be identified by the narrow ductus bursae and large, elliptical corpus bursae.

Material examined. Ryung Hpieng (= Yong Pyung?), Coree, 1 ♀, 11 VI 1939 (ZSM)

Remarks. Beljaev and Oh (2001) reported this species for the first time in Korea based on three females from Gwangneung, Mt. Seolak and Mt. Weolak. The systematic position of the species is ambiguous in terms of the male and female genitalia (Xue and Zhu, 1999; Beljaev and Oh, 2001). Xue and Zhu (1999) noted that this species is close to another genus *Entephria* Hübner. Prout (1938) noted a close relationship with an Indian species, *Euphyia contortilinea* Warren. Throughout the present study, the female genitalia of *E. discomelaina* differ from *E. cineraria* in the overall structure and this result agrees on the previous findings. The future

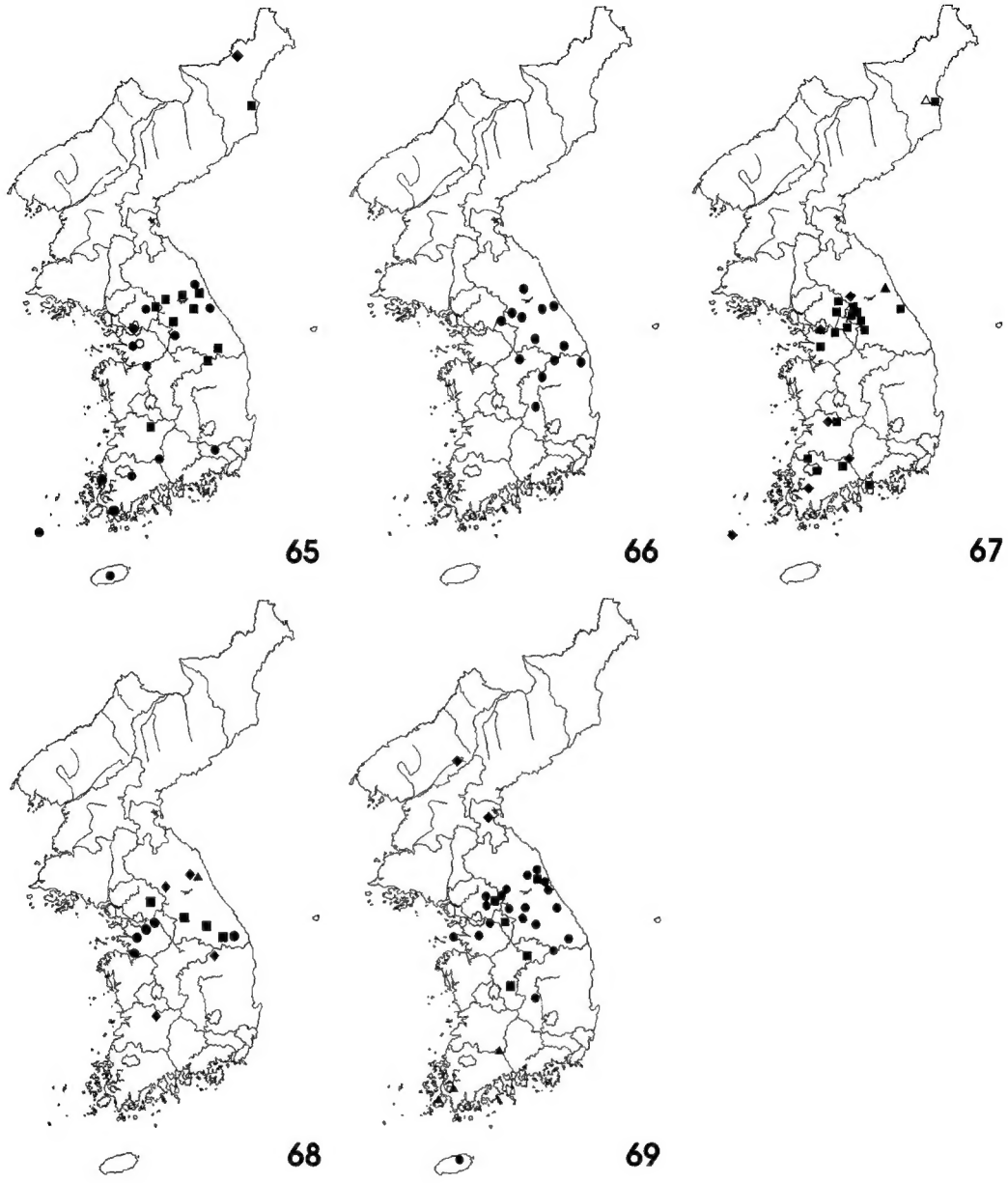


Fig. 65. Distribution map of the Xanthorhoini in Korea. Solid square (■) *Glaucorhoe unduliferaria*; solid circle (●) *Orthonama obstipata*; solid diamond (◆) *Scotopteryx acutangulata*; and open circle (○) *Costaconvexa caespitaria*.

Fig. 66. Distribution map of *Epirrhoe supergressa* in Korea.

Fig. 67. Distribution map of the Xanthorhoini in Korea. Solid square (■) *Xanthorhoe muscicapata*; open triangle (△) *X. flucutata*; solid triangle (▲) *X. quadrifasiata*; solid diamond (◆) *X. saturata*.

Fig. 68. Distribution map of the Xanthorhoini in Korea. Solid square (■) *Xanthorhoe biriviata*; solid triangle (▲) *X. designata*; solid circle (●) *X. hortensiaria*; and solid diamond (◆) *X. abraxina*.

Fig. 69. Distribution map of the Xanthorhoini in Korea. Solid circle (●) *Euphyia cineraria*; solid square (■) *E. discomelaina*.; solid triangle (▲) *Catarhoe obscura*; and solid diamond (◆) *C. yokohamae*.

study using both males and females will resolve the systematic position of the species.

Distribution. Korea, China.

Epirrhoe Hübner

Epirrhoe Hübner, 1825, Verz. bekannter Schmett.: 328.

Type species: *Geometra rivata* Hübner, 1813, Samml. eur. Schmett., 5: pl. 79, fig. 409, by subsequent designation by Hulst, 1896, Trans, Am. ent. Soc., 23: 279. TL: [Europe].

Epirrhoe supergressa (Butler) 두흰줄물결자나방

(Figs. 5, 62, 63, 64, 66)

Melanippe supergressa Butler, 1878, Ann. Mag. nat. Hist., (5) 1: 448. TL: Hakodate, Yokohama, Japan.

Plemyria rivata Hübner: Leech, 1897, Ann. Mag. nat. Hist., (6) 19: 570.

Cidaria supergressa: Doi, 1938, Kagakukanpo, 78: 6.

Cidaria supergressa albigressa Prout, 1938, in Seitz, Macrolep. World 4, (Suppl.): 163. TL: Ussuri, Russia.

Epirrhoe supergressa albigressa: Pak, 1969, Report Biological Circle, Dong Myung Grils' High School: 43.

Epirrhoe supergressa: Min. Educ., 1967, The report of the academic survey Mt. Sorak: 185.

Euphyia secessa Bryk, 1949, Ark. Zool., 41A (1): 175. TL: Juul [Shoutsu], North Korea. Synonymized by Choi & Shin, 1997.

Euphyia secessa myokosana Bryk, 1949, Ark. Zool., 41A (1): 176. TL: Mt. Myohyang [Myokosan], North Korea. Synonymized by Choi & Shin, 1997.

Diagnosis. This species (wingspan 26–28 mm) is externally similar to *Euphyia cineraria*, but can be easily identified by the whitish band between basal and central fascia of forewing and the whitish abdomen with double dots on each segment. The male genitalia can be identified by the sharply pointed end of costa and hair-like androconia on the sacculus. The female genitalia can be identified by the straight ductus bursae with ovate corpus bursae with a lump-shaped projection close to the opening of ductus bursae.

Material examined. [GW] Kangwon Univ., 1 ♂, 15 V 1996 (JS Lee); 1 ♂, 1 ♀, 14 VI 1987 (KT Park & U Park); Mt. Yaksu, 1 ♂, 9 VIII 1989 (KT Park); Gotan, Chuncheon, 1 ♀, 13 VI 1987 (KT Park); Seomyon (Yangyang), 1 ♀, 13 VI 1987 (KT Park); Mt. Jeombong, 1 ♂, 24 VI 1992 (KT Park) (NIAST); Mt. Taebaek, 1 ♀, 21 V 1987, 1 ♂, 25 VI 1987, 1 ♂, 23 VII 1987; Jinburyong, 1 ♂, 14 VI 1992 (SW Choi); Mt. Paekduk, 1 ♂, 4 VII 1981 (KHU) [GG] Mt. Yumyoung, 1 ♂, 31 VII 1990 (HY Choi & SH Oh) (NIAST) [CB] Jungwon, 1 ♂, 21–25 VIII 1991 (NIAST) [GB] Yaecheon, 1 ♂, 31 V 1991; Mt. Sobaek, 1 ♀, 7 V 1976 (SM Lee) (NIAST); Mt. Bohyun, 2 ♂, 27 VII 1991; Mt. Sobaek, 1 ♂, 8 VIII 1985; Mt. Tonggo, 1 ♂, 27 VI 1986 (KHU).

Host plant. Sato and Nakajima (1987) reported that *E. supergressa* feeds on *Galium* spp. (Rubiaceae).

Distribution. Korea, Japan, China, Russian Far East.

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